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10/805,338 .	03/22/2004	Shin-ichi Nishizono	1075.1254	8996

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ART UNIT	PAPER NUMBER
2181	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/805,338	NISHIZONO ET AL.
	Examiner	Art Unit	
	Chun-Kuan (Mike) Lee	2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05/21/2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-28</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-28</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>22 March 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

CONTINUED EXAMINATION UNDER 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on

05/21/2007 has been entered.

RESPONSE TO ARGUMENTS

2.   Applicant's arguments filed 05/21/2007 have been fully considered but they are

not persuasive. Currently, claims 1-28 are pending for examination.

3.   In response to applicant's arguments, on page 12, 3rd paragraph, regarding the

amended claims 1, 10, 19 and 28 rejected under 35 U.S.C. 103(a) that the combination

of references does not teach/suggest the amended claim limitation of "reconnection

queue for enqueuing control blocks storing reconnection information on one or more

input/output requests;" applicant's arguments have fully been considered, but are not

found to be persuasive.

        AAPA teaches reconnection queue for enqueuing control blocks storing

reconnection information on one or more input/output request (Specification, p. 5, II. 5-

16 and p. 9, ll. 5-16), wherein the enqueued I/O requests are issued for reconnection
and each I/O request is controlled and regulated in order to obtain reconnection
success; therefore, there is a queue of control blocks with reconnection information
associated with the queue of I/O requests waiting for reconnection.

4.   In response to applicant's arguments, on page 13, last paragraph, regarding the
amended claims 1, 10, 19 and 28 rejected under 35 U.S.C. 103(a) that the combination
of references does not teach/suggest the claimed limitation of "dynamically switching
the system ... according to the number of the enqueued control blocks;" applicant's
arguments have fully been considered, but are not found to be persuasive.

Please note that one cannot show nonobviousness by attacking references
individually where the rejections are based on combinations of references. See *In re
Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091,
231 USPQ 375 (Fed. Cir. 1986). In this case, the examiner relied on the references as
following for the teaching of the above claimed limitation:

AAPA teaches the number of the enqueued control blocks (Specification, p. 5, ll.
5-16 and p. 9, ll. 5-16), wherein the enqueued control blocks are associated with the
number of enqueued I/O requests.

Coates teaches the dynamically switching of the system according to the number
of enqueued buffered data (e.g. control blocks) (Fig. 5; col. 3, ll. 36-50 and col. 11, ll.
21-32), wherein base on the number of data buffered, the fullness of the buffer is
determined, and base on the fullness of the buffer, the system is dynamically switched

(e.g. switching between the system operating at higher transmission rate and the system operating at lower transmission rate)

By combining Coates with AAPA, the resulting combination of the references teaches dynamically switching the system according to the number of the enqueued control blocks (i.e.data).

I. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

5.   The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63.**

II. INFORMATION CONCERNING DRAWINGS

Drawings

6.   The applicant's drawings submitted are acceptable for examination purposes.

III. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.   Claims 1-2, 9-11, 18-20 and 27-28 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Coates et al. (US

Patent 6,694,389).

8.   As per claims 1, 10, 19 and 28, AAPA teach a storage apparatus and a

reconnection controlling method comprising:

        a physical device (Drawings, Fig. 6, ref. 2a); and

        a storage controlling apparatus (i.e. controller) (Drawings, Fig. 6, ref. 3) disposed

between said physical device and a host (Drawings, Fig. 6, ref. 4) to control an access

from said host to said physical device (Specification, page 1, l. 22 to page 2, l. 2);

        said storage controlling apparatus comprising:

                one or more host interface modules (Drawings, Fig. 6, ref. 20), connected

to a plurality of channels (Drawings, Fig. 6, ref. 50) of said host through a plurality

of paths belonging to the same path group, for controlling an interface with said

host (Specification, page 2, ll. 17-19);

                a management module (Drawings, Fig. 6, ref. 20) for generally managing

the whole of said storage controlling apparatus (Specification, page 2, ll. 20-21);

                said management module comprising:

                        a reconnection queue for enqueuing control blocks storing

                reconnection information on one or more input/output requests among

                input/output requests from said channels of said host (Specification, p. 5,

                ll. 5-16 and p. 9, ll. 5-16), wherein the enqueued I/O requests are issued

for reconnection and each I/O request is controlled and regulated in order

to obtain reconnection success; therefore, there it would be obvious to

include the queue of control blocks with reconnection information

associated with the queue of I/O requests waiting for reconnection; and

a controlling mean, when an I/O process corresponding to one of

said one or more control blocks managed in said reconnection queue is

resumed, for controlling resumption of said I/O process in either

a first system of issuing a reconnection request to each of

said paths belonging to the same path group one by one through

said host interface module and requesting said host interface

module to perform said I/O process using a path first successful in

reconnection at the point of time that the reconnection succeeds

(Specification, page 7, ll. 5-16), wherein the implementation of the

first system would result in the lower transmission rate as the

requesting is implemented one by one, or

a second system of issuing concurrently or almost

concurrently the reconnection request to said plural paths

belonging to the same path group through said one or more host

interface modules and requesting said host interface module to

perform said I/O process using a path which first succeeds in the

reconnection (Specification, page 7, ll. 17-26), wherein the

implementation of the second system would result in the higher

transmission rate as the requesting may be implemented to more

than one host interface module, and further more, there must be

the controlling mean in order to properly operate in either the first

system or the second system.

AAPA does not expressly teach the storage apparatus and the reconnection

controlling method comprising wherein said management module comprising:

the control means for the first system and the second system;

a monitoring means for monitoring the number of said enqueued control blocks in

said reconnection queue; and

a switching means for dynamically switching the system to be executed by said

controlling means to either said first system or said second system according to the

number of the enqueued control blocks monitored by said monitoring means.

Coates teaches a method and a apparatus for data flow control comprsing:

determining the occupancy (e.g. fullness) of a buffer by counting the number of

sub-buffers in a steady state of starvation and congestion (col. 11, ll. 21-32); and

determining if the fullness of the buffer is above an upper threshold (Fig. 5, ref.

500 and col. 3, ll. 36-50);

signaling the receiver regarding the increase of transmission rate if the fullness of

the buffer is above said upper threshold (Fig. 5, ref. 520 and col. 3, ll. 36-50), therefore

there would be an increase in the amount of data transferred from the buffer to the

receiver;

determining if the fullness of the buffer is below an lower threshold (Fig. 5, ref. 530 and col. 3, II. 36-50);

signaling the receiver regarding the reduction of transmission rate if the fullness of the buffer is below said lower threshold (Fig. 5, ref. 540 and col. 3, II. 36-50), therefore there would be a reduction in the amount of data transferred from the buffer to the receiver, wherein the data flow control enables the switching between operating at transferring the increased amount of data and operating at transferring the reduced amount of data.

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Coates's buffer flow control into AAPA's management module's queuing of the requests. The resulting combination of the references teaches the storage apparatus and the reconnection controlling method further comprising:

monitoring by determining the fullness of the buffer enqueuing the control blocks on one or more input/output requests by counting the number of the euqueued control blocks;

determining if the number of control blocks in the reconnection queue is greater than the limitation, and if it is determined to be greater, more requests would be transferred (increasing the amount of requests from the buffer to the receiver), therefore would operate the control mean for the second system (i.e. scattering mode) as multiple requests are concurrently issued and transferred from the buffer to the receiver (e.g. host);

determining if the number of control blocks in the reconnection queue is lesser

than the limitation, and if it is determined to be lesser, less request would be transferred

(reducing the amount of requests from the buffer to the receiver), therefore operating

the control mean for the first system (i.e. one path mode) as requests are issued and

transferred one at a time from the buffer to the receiver; and

switching between operating at the second system (e.g. transferring more

requests) and operating at the first system (e.g. transferring lesser requests) base on

the fullness of the reconnection queue, therefore, the control means would operate in

either the first system or the second system.

Therefore, it would have been obvious to combine Coates with AAPA for the

benefit of implementing a robust flow control ensuring the buffer does not become full

(congested) or empty (starved) during transmission of data (Coates, col. 1, ll. 11-24).

9.   As per claims 2, 11 and 20, AAPA and Coates teach all the limitations of claims

1, 10 and 19 as discussed above, where Coates further teaches the storage apparatus

and the reconnection controlling method comprising:

wherein when said the number of the enqueued control blocks monitored by said

monitoring means is not larger than a predetermined number (Fig. 5, ref. 530), said

switching means switches the system to be executed by said controlling means to said

first system (Fig. 5, ref. 540), and

when the number of the enqueued control blocks monitored by said monitoring

means exceeds said predetermined number (Fig. 5, ref. 500), said switching means

switches the system to be executed by said controlling means to said second system

(Fig. 5, ref. 520).

10.   As per claims 9, 18 and 27, AAPA and Coates teach all the limitations of claims

1, 10 and 19 as discussed above, where AAPA further teaches the storage apparatus

and the reconnection controlling method comprising wherein when said second system

is executed, said controlling means successively requests the second and later paths

which succeed in the reconnection to perform the I/O processes corresponding to one

ore more control blocks which can be reconnected among said control blocks managed

in said reconnection queue (AAPA, Specification, page 7, l. 17 to page 9, l. 1).

11.   Claims 3-8, 12-17 and 21-26 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Applicant's Admitted Prior Art (AAPA) and Coates et al. (US Patent

6,694,389), and further in view of Mizuno (US Patent 6,922,743).

AAPA and Coates teach all the limitations of claims 1, 10 and 19 as discussed

above.

AAPA and Coates does not teach the storage apparatus and the reconnection

controlling method further comprising:

wherein said management module further comprises a management table for

managing a use status of each of said paths through said one or more host interface

modules; and

when either said first system or said second system is executed, said controlling

means refers to said management table to issue the reconnection request to the

corresponding paths set free in said management table through said host interface

module.

Mizuno teaches a system and a method comprising:

a controller (Fig. 5, ref. 530) comprising a cross-call administration table (Fig. 5,

ref. 540); and

wherein the cross-call administration table provides the status of a port (e.g.

ready flag) that a I/O path is connected to (Fig. 8, ref. 825, 835), and further more, the

cross-call administration table is read out to determine which of the channel control

processors (Fig. 5, ref. 505) controlling the ports are not busy in order to carry out the

reconnection process (col. 9, ll. 13-26).

It would have been obvious to one of ordinary skill in this art, at the time of

invention was made to include Mizuno's cross-call administration table and the

corresponding ready flag into AAPA and Coates's management module. The resulting

combination of the references teaches the storage apparatus and the reconnection

controlling method further comprising:

the management module comprises the cross-call administration table with the

ready flag; and

when operating in either the first system or the second system, the control mean

reads out the cross-call administration table in order to determine, through the host

interface module (e.g. channel control processors), which of the I/O path is not busy to

implement the reconnection process.

Therefore, it would have been obvious to combine <u>Mizuno</u> with <u>AAPA</u> and

<u>Coates</u> for the benefit of increasing the data throughput to the host as the response to

the host's request can be made rapidly (<u>Mizuno</u>, col. 4, ll. 39-43).

IV. CLOSING COMMENTS

Conclusion

a. STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the

application as recommended by **M.P.E.P. 707.07(i)**:

a(1) CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, claims 1-28 have received a first action on the merits

and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chun-Kuan (Mike) Lee whose telephone number is

(571) 272-0671. The examiner can normally be reached on 8AM to 5PM.

IMPORTANT NOTE

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Alford Kindred can be reached on (571) 272-4037. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

July 2, 2007   Chun-Kuan (Mike) Lee
                                                     Examiner
                                                     Art Unit 2181

                                                     ALFORD KINDRED
                                                     PRIMARY EXAMINER